Two thick, fresh salmon steaks are shown against a light blue background. The top steak is positioned slightly behind and to the right of the bottom one, creating a sense of depth. The vibrant orange-red color of the salmon flesh and the silvery-grey skin are clearly visible.

Protein Chemistry 1

A detailed image of a fish head, likely a salmon, is shown in profile against a light blue background. The fish's eye is prominent, and its mouth is slightly open, revealing a yellowish interior. The scales on its head are finely detailed.

Ph.D Students

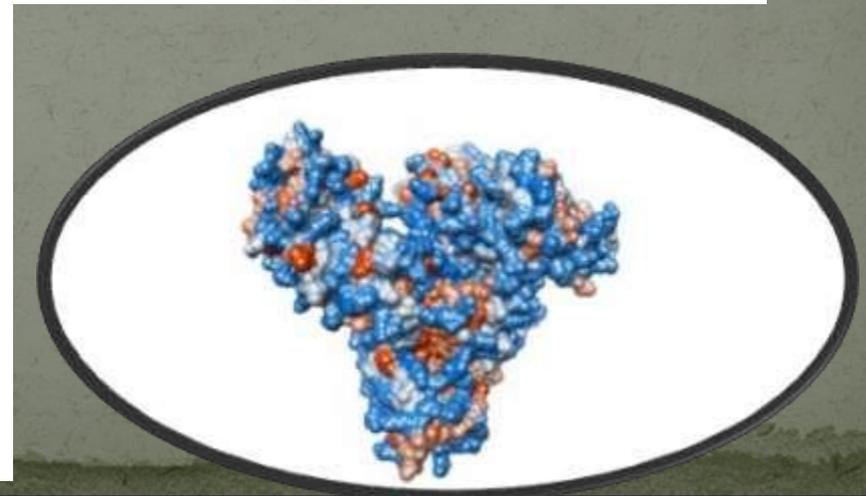
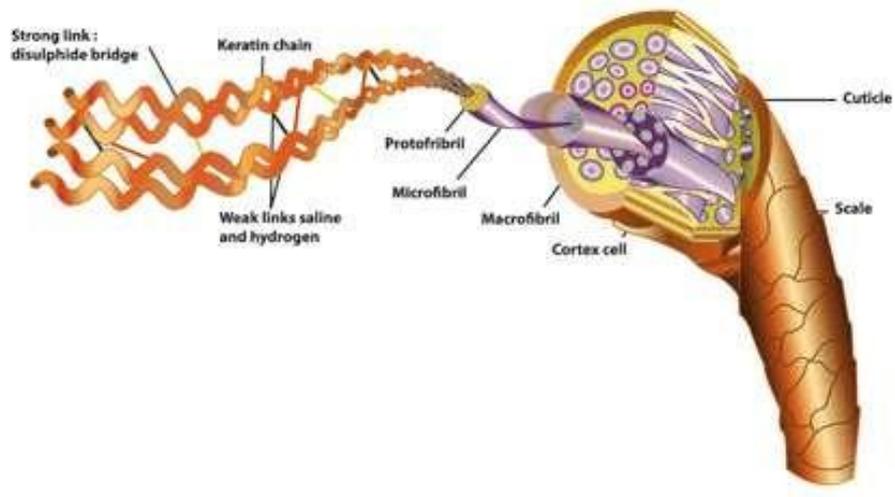
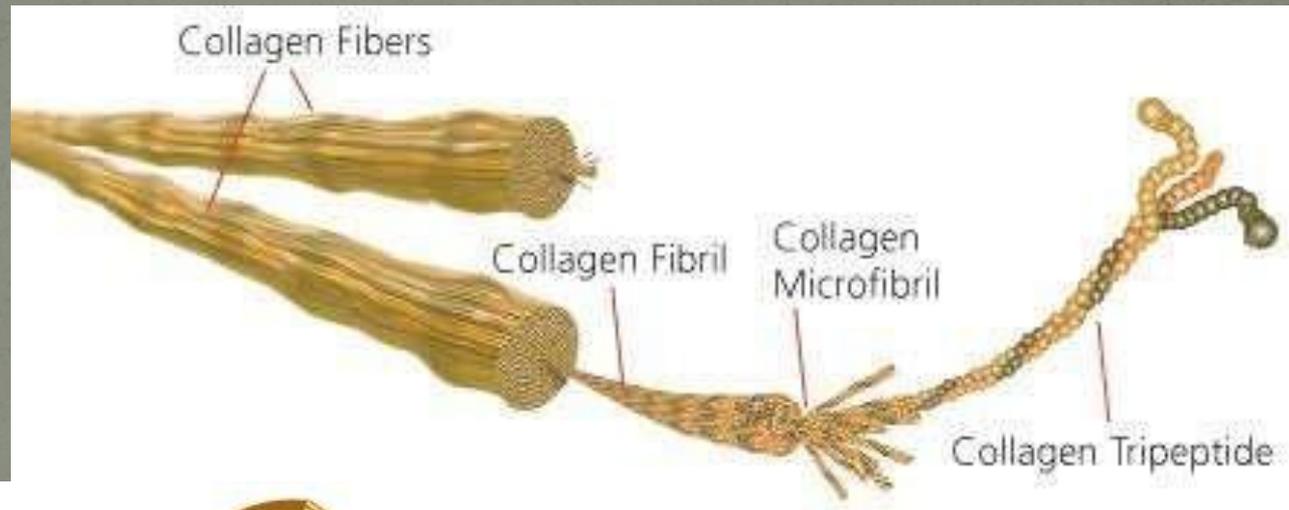
A. Y. Al-Dubakel

2019 -2020

Simple proteins

Also known as **homoproteins**, they are made up of only amino acids.

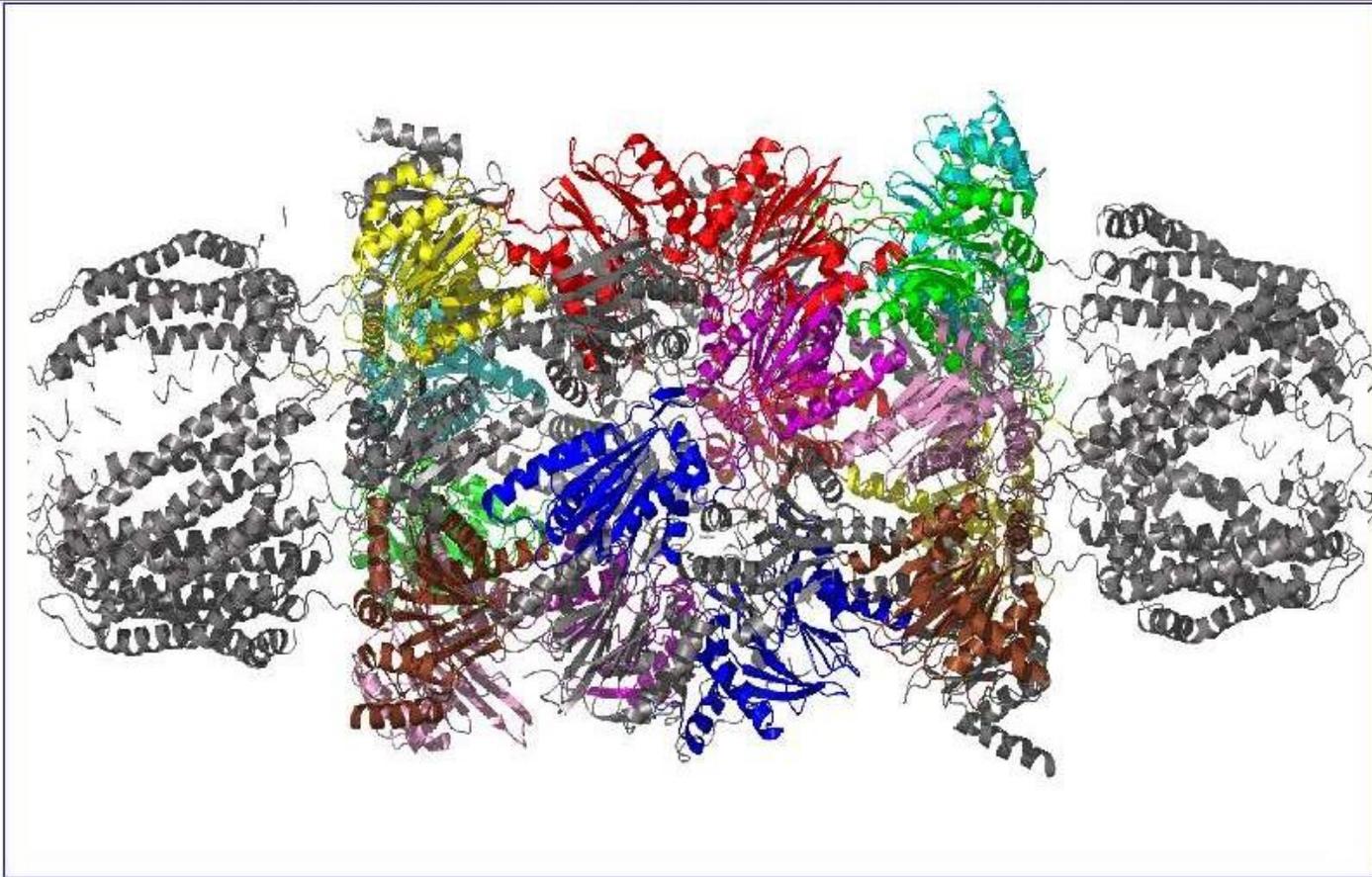
Examples are **plasma albumin, collagen, and keratin**



Conjugated proteins

Sometimes also called **heteroproteins**, they contain in their structure a non-protein portion.

Three examples are **glycoproteins**, **chromoproteins**, and **phosphoproteins**.



Glycoproteins

They are proteins that **covalently bind one or more carbohydrate units to the polypeptide backbone.**

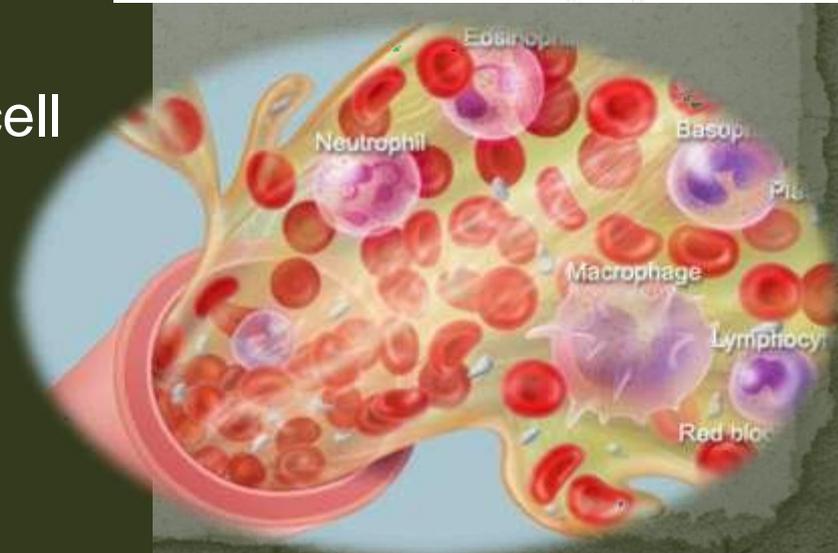
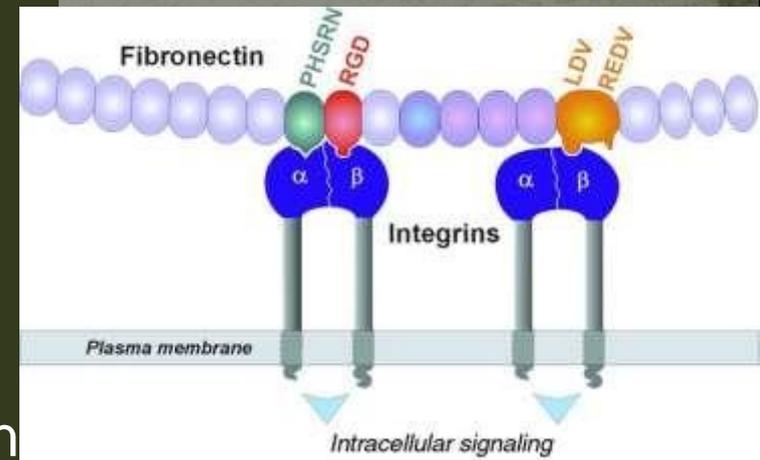
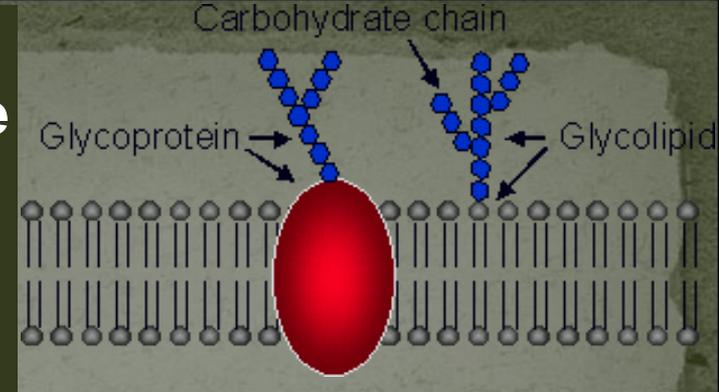
Examples of glycoproteins are:

□ **glycophorin**, the best known among erythrocyte membrane glycoproteins;

□ **fibronectin**, that anchors cells to the extracellular matrix through interactions on one side with collagen or other fibrous proteins, while on the other side with cell membranes;

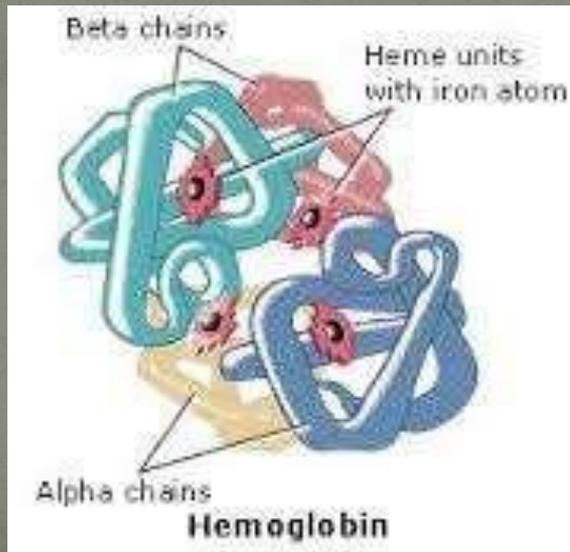
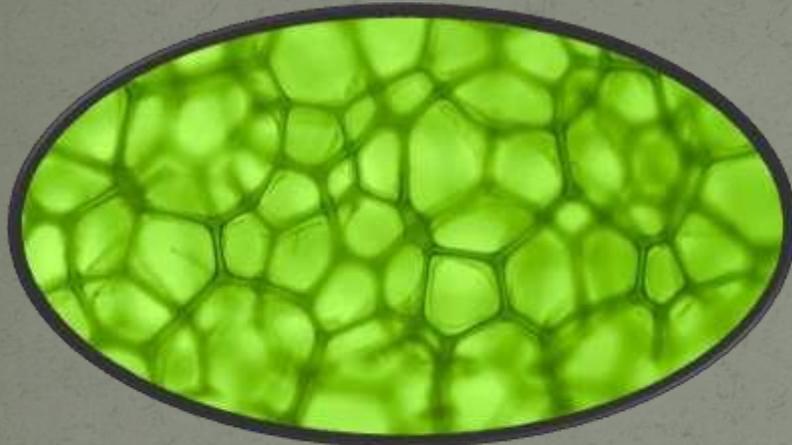
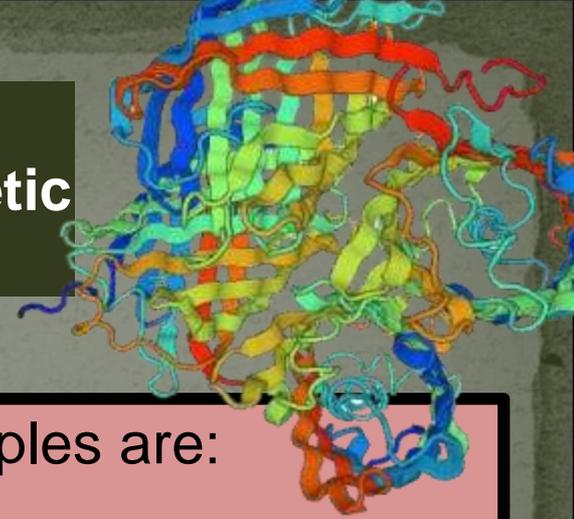
□ **all blood plasma proteins**, except albumin;

□ **immunoglobulins or antibodies.**



Chromoproteins

They are proteins that contain **colored prosthetic groups**.



Typical examples are:

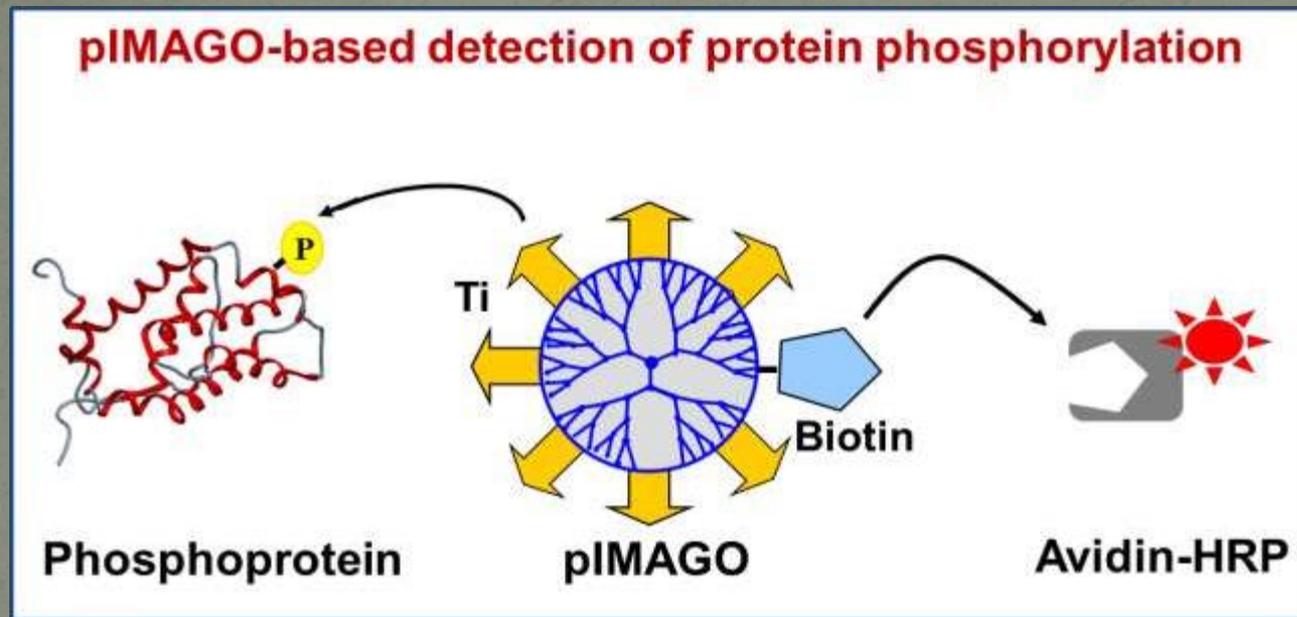
□ **hemoglobin and myoglobin**, which bind, respectively, one and four heme groups;

□ **chlorophylls**, which bind a porphyrin ring with a magnesium atom at its centre;

□ **rhodopsins**, which bind retinal.

Phosphoproteins

- They are proteins that bind phosphoric acid to serine and threonine residues.
- Generally, they have a **structural function and reserve function**



structural function- tooth dentine

reserve function,- milk caseins, egg yolk phosvitin.

Protein classification based on shape

On the basis of their shape, proteins may be divided into two classes:

- fibrous and
- globular



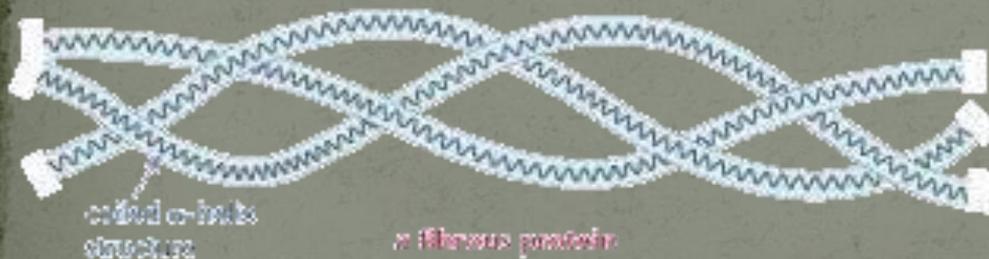
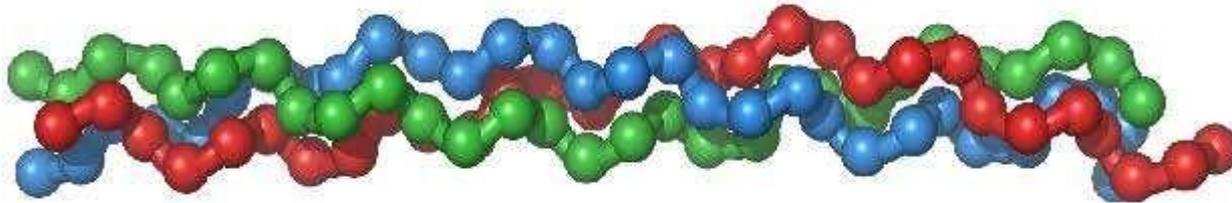
Fibrous Protein



Globular Protein

Fibrous proteins

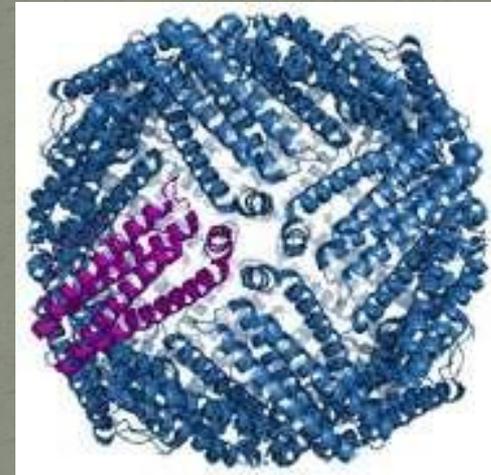
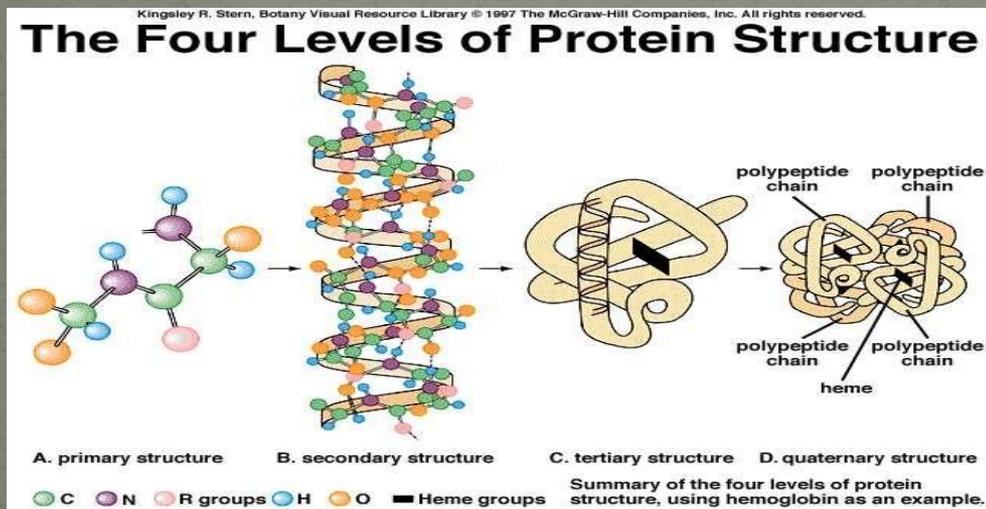
- They have primarily **mechanical and structural functions**, providing **support to the cells as well as the whole organism**.
- These proteins are **insoluble in water** as they contain, both internally and on their surface, many **hydrophobic amino acids**.



The presence on their surface of hydrophobic amino acids facilitates their packaging into very complex supramolecular structures

Globular proteins

- ❑ Most of the proteins belong to this class.
- ❑ They have a **compact and more or less spherical structure**, more complex than fibrous proteins.
- ❑ In this regard, motifs, domains, tertiary and quaternary structures are found, in addition to the secondary structures.



They are generally soluble in water but can also be found inserted into biological membranes (transmembrane proteins).

Unlike fibrous proteins, that have structural and mechanical functions, they act as:

- ❖ enzymes;
- ❖ hormones;
- ❖ membrane transporters and receptors;
- ❖ transporters of triglycerides, fatty acids and oxygen in the blood;
- ❖ immunoglobulins or antibodies;
- ❖ grain and legume storage proteins.

